

WHAT IS CLAIMED IS:

1. A crystal scintillator comprising a transparent single crystal of cerium-activated lutetium yttrium oxyorthosilicate having the general formula $\text{Lu}_{(2-x-z)}\text{Y}_x\text{Ce}_z\text{SiO}_5$, wherein $0.05 \leq x \leq 1.95$ and $0.001 \leq z \leq 0.02$.

5 2. The crystal scintillator of claim 1, wherein $0.2 \leq x \leq 1.8$.

3. The crystal scintillator of claim 2, wherein said scintillator has a luminescence wavelength of about 420 nm.

4. The crystal scintillator of claim 3, wherein said scintillator has a luminescence decay time of about 35-45 ns.

10 5. A scintillation detector, comprising:

(a) the crystal scintillator of claim 1, and

(b) photodetector optically coupled to said crystal scintillator for detecting light from said crystal scintillator.

15 6. The detector of claim 5, wherein said photodetector comprises a photomultiplier tube.

7. The detector of claim 5, wherein said photodetector comprises a charge-coupled device.

20 8. A scintillation detector, comprising:

(a) the crystal scintillator of claim 2, and

(b) a photodetector optically coupled to said crystal scintillator for detecting light from said crystal scintillator.

9. The detector of claim 8, wherein said photodetector comprises a photomultiplier tube.

25 10. The detector of claim 8, wherein said photodetector comprises a charge-coupled device.